

Lunar Laser Tests of Gravitational Physics

J. G. Williams, D. H. Boggs, J. O. Dickey, and W. M. Folkner
Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA, 91109
(e-mail James.G.Williams@jpl.nasa.gov)

Analyses of laser ranges from earth to moon yield several tests of interest to gravitational physics. Examined are the equivalence principle, geodetic precession, PPN beta and gamma based on the point-mass interaction, and invariance of the gravitational constant. Ranges extend into this year and the weighted rms range residual for the past four years is 1.8 cm after fitting parameters associated with the earth, moon, and orbit. The improved range accuracy and the longer data span result in solution uncertainties for gravitational physics parameters which are reduced by factors of two or more compared to our previously published lunar laser analyses. The lunar data has moderate sensitivity to solar oblateness.